

**Louisiana Department of Environmental Quality (LDEQ)  
Office of Environmental Services**

**STATEMENT OF BASIS**

**MDI 2 Plant  
BASF Corporation – Geismar Site  
Geismar, Ascension Parish, Louisiana  
Agency Interest Number: 2049  
Activity Number: PER20030002  
Proposed Permit Number: 2559-V3**

**I. APPLICANT**

**Company:**

BASF Corporation  
PO Box 457  
Geismar, LA 70734-0457

**Facility:**

MDI 2 Plant  
8404 River Road (between I-10 and Hwy 75), Geismar, Ascension Parish, Louisiana  
Approximate UTM coordinates are 692.5 km East and 3342.8 km North, Zone 15

**II. FACILITY AND CURRENT PERMIT STATUS**

BASF Corporation operates the Geismar Site, a chemical manufacturing complex, on the east bank of the Mississippi River between I-10 and Highway 75. The BASF Geismar facility produces acetylene, amine compounds, aniline, ethylene oxide, ethylene glycol, glyoxal, 1,4-butanediol, N-methyl pyrrolidone, toluene diisocyanate, tetrahydrofuran, polytetrahydrofuran, vinylpyrrolidone, polyvinylpyrrolidone, polyols, butyrolactone, surfactants, and methylenebis(phenylisocyanate).

The purpose of the current proposal is for renewal of the MDI 2 Part 70 Operating Permit. Also, some minor changes are proposed to reconcile emission rates from the Thermal Oxidizer, the MDI 2 Flare, the Destruct Tower, the MDI 2 Storage tanks, the Loading operations and fugitive emissions.

BASF Corporation is currently operating the MDI 2 Plant under Part 70 Permit No. 2559-V2 issued December 28, 2001.

**III. PROPOSED PROJECT / PERMIT INFORMATION**

**Application**

BASF Corporation submitted an application and Emission Inventory Questionnaire (EIQ) dated February 24, 2003, requesting a Part 70 Operating Permit Renewal for the MDI 2 Plant. An updated application dated October 13, 2006 was also submitted.

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**Existing Process**

BASF is operating the MDI 2 Plant east of the existing MDI Plant. It consists of several independent processes manufacturing a variety of MDI based products. Existing support facilities (plant water, air, and nitrogen and electrical supply) are used at this plant. The existing wastewater treatment plant (WWTP) is used to manage MDI 2 Plant wastewater.

The MDI process involves first reacting aniline and formaldehyde in the presence of hydrochloric acid (HCl) to produce a polyamine solution. After purification, the solution forms a polyamine mixture containing 4,4'-methylene dianiline (MDA) and other MDA oligomers. An offgas wash tower consisting of a packed column scrubs off gases from the MDA unit with water. The MDA and a monochlorobenzene (MCB) solvent are premixed and combined with a phosgene/MCB stream in the mixing nozzle, producing a solution of polydiphenyl methane diisocyanate and HCl.

The product, crude MDI, is further refined into various products, such as monomeric MDI and several commercial grades of polymeric MDI. A portion of the monomeric MDI is reacted with various polyols to produce prepolymers, which are also marketed as commercial MDI products. Off gases from the process are ultimately controlled in the thermal oxidizer or the flare.

Debromination equipment improves the quality of chlorine used to produce MDI. The debromination equipment consists of a distillation column and overhead reflux condenser, a reboiler, a superheater exchanger, a neutralization system, pumps, and a heat exchanger. The distillation column is not subject to New Source Performance Standards (NSPS), as the unit does not produce any of the listed chemicals to which the NSPS apply.

BASF produces 22° Baume' hydrochloric acid (22° Be' HCl). MDI 2 achieves 100% absorption of HCl as 22° Be' acid by sending part of the feed HCl gas to Falling Film Absorber E-2402. Any remaining HCl is then fed to and absorbed in the HCl Absorption Column T-2400. Absorption water is split to the two absorbers, with recycle acid from the absorber tower T-2400 going to the falling film absorber E-2402.

Sources of air emissions include a thermal oxidizer, a flare, a destruct tower, a cooling tower, storage tanks, fugitives, and product loading. Distillation towers and process reactors are routed to the thermal oxidizer and/or scrubbers for emissions control.

**Permitted Air Emissions**

Estimated permitted emissions for this Part 70 Operating Permit Renewal in tons per year are as follows:

Pollutant	Before	After	Change
PM <sub>10</sub>	3.61	3.67	+ 0.06
SO <sub>2</sub>	0.02	0.02	-
NO <sub>x</sub>	2.47	2.47	-
CO	18.07	18.07	-
VOC	4.26	8.60*	+ 4.34
Chlorine	0.15	0.19	+ 0.04
Hydrochloric acid	0.61	0.09	- 0.52
Tetrachloroethylene	0.002	0.61	+ 0.608

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\*VOC Speciation:

VOC LAC 33:III.Chapter 51 TAPs:

1,2-Dichloropropane	0.54
Aniline	0.19
Carbon tetrachloride	0.78
Formaldehyde	0.03
n-Hexane	0.09
Methylene diphenyl diisocyanate (MDI) [Table 51.3]	0.31
4,4'-Methylene dianiline (MDA) [Table 51.3]	0.46
Methyl Ethyl Ketone (MEK)	0.001
Chlorobenzene	4.89
Phosgene	0.002
Toluene	0.19
Chloroform (Trichloromethane)	0.66
Other VOC (Non-LAC 33:III.Chapter 51)	0.45
<b>Total</b>	<b>8.60</b>

#### IV. REGULATORY ANALYSIS

The applicability of the appropriate regulations is straightforward and provided in the Specific Requirements section of the proposed permit. Similarly, the Monitoring, Reporting and Recordkeeping necessary to demonstrate compliance with the applicable terms, conditions and standards are also provided in the Specific Requirements section of the proposed permit.

##### Applicability and Exemptions of Selected Subject Items

ID No:	Applicable Requirement	Compliance Method/Provisions	Notes
EQT 457  37-97 MDI 2 Thermal Oxidizer	Control of Emission of Smoke LAC 33:III.1101.B	Emission of smoke shall be controlled so that the shade or appearance of the emission is not darker than 20 percent average opacity.	
	Emissions Standards for Particulate Matter LAC 33:III.1311.C	Particulate matter opacity <= 20%	
	Emission Standards for Sulfur Dioxide LAC 33:III.1503	Emissions of SO <sub>2</sub> shall not exceed 2000 ppmv by volume at standard conditions. Exempt-facility emits < 250 TPY	Record keeping is required
	Waste Gas Disposal LAC 33:III.2115	EXEMPT. The waste stream is required to comply with the Hazardous Organic NESHAP (HON).	
	Limiting VOC Emissions from SOCM I Reactor Processes and Distillation Operations LAC 33:III.2147	EXEMPT. Subject to the Hazardous Organic NESHAP (HON) per LAC 33:III.2147.A.2.g.	
	Comprehensive Toxic Air Pollutant Control Program LAC 33:III.5109	Comply with applicable HON provisions.	

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<b>ID No:</b>	<b>Applicable Requirement</b>	<b>Compliance Method/Provisions</b>	<b>Notes</b>
EQT 457  37-97 MDI 2 Thermal Oxidizer (Cont'd)	NSPS Subpart NNN – Distillation Operations 40 CFR 60.660	EXEMPT. Group 1 process vent that is also subject to NSPS Subpart NNN is required to comply only with the HON per 40 CFR 63.110(d)(4).	
	NSPS Subpart RRR – Reactor Processes 40 CFR 60.700	EXEMPT. Group 1 process vent that is also subject to NSPS Subpart RRR is required to comply only with the HON per 40 CFR 63.110(d)(7).	
	NESHAP (HON) Subparts F and G for Process Vents 40 CFR 63.100, 113(a)(2) and (c)	Reduce emissions of total OHAPs by 98% by weight. [63.113(a)(2)]. The vent stream exiting the combustion device shall be ducted to a caustic scrubber to reduce halogen to < 0.45 kg/hr. [113(c)(1)(i)]	
	NESHAP Subpart NNNNN – Hydrochloric Acid Production 40 CFR 63.8985(c)	EXEMPT. The emissions from the HCl production facility are subject to Section 63.113(c), Subpart G, NESHAP (HON) for process vents, storage vessels, transfer operations, and wastewater.	
EQT 458 37-97(a) Phosgene Stripper	Waste Gas Disposal LAC 33:III.2115	EXEMPT. The waste stream is required to comply with the Hazardous Organic NESHAP (HON).	
	Comprehensive Toxic Air Pollutant Control Program, LAC 33:III.5109	Comply with NESHAP (HON) Subparts F and G, 40 CFR 63.100, 113(a)(2) and 113(c).	
	NSPS Subpart NNN – Distillation Operations 40 CFR 60.660	EXEMPT. Group 1 process vent that is also subject to NSPS Subpart NNN is required to comply only with the HON per 40 CFR 63.110(d)(4).	
	NESHAP (HON) Subparts F and G for Process Vents 40 CFR 63.100, 113(a)(2) and (c)(1)	The final control device for the Group 1 process vent is the thermal oxidizer followed by a caustic scrubber.	Vents to MDI 2 Thermal Oxidizer (37-97)
EQT 544 EQT 545 EQT 547  Flare Sump WW Destruct Tower WW Thermal Oxidizer WW	Limiting VOC Emissions from Industrial Wastewater - LAC 33:III.2153	DOES NOT APPLY. Wastewater stream does not meet the definition of an affected volatile organic compound (VOC) wastewater as per LAC 33:III.2153.A	WW Streams are routed to the Utilities Unit
	NESHAP (HON) Subpart F and G for Process Wastewater 40CFR 63.100 and 132	DOES NOT APPLY. Streams do not meet the definition of wastewater as defined in 40 CFR 63.101	
EQT 546 MDA Unit WW Stream	Limiting VOC Emissions from Industrial Wastewater LAC 33:III.2153	EXEMPT. The wastewater stream is required to comply with the Hazardous Organic NESHAP (HON).	
	Comprehensive Toxic Air Pollutant Control Program, LAC 33:III.5109	Comply with NESHAP (HON) Subparts F and G, 40 CFR 63.100, 132(a)(2) and 136 (b), (c) and (d).	
	NESHAP (HON) Subparts F and G for Wastewater 40 CFR 63.100, 132(a)(2) and 136 (b), (c) and (d)	Comply with the individual drain system requirements in 40 CFR 63.136. Wastewater is treated in a biological treatment unit (Utilities Plant) meeting the requirements of 40 CFR 63.138(g), 95% RMR option.	Group 1 wastewater stream

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**Streamlined Equipment Leak Monitoring Program**

It is required that the MDI 2 Plant comply with a streamlined equipment leak monitoring program. Compliance with the streamlined program shall serve to comply with each of the fugitive emission monitoring programs being streamlined.

For the MDI 2 Plant, fugitive emissions are subject to the requirements of 40 CFR 63 Subpart H, 40 CFR 60 Subpart VV, LAC 33:III.2122, and LAC 33:III.5109. Among these regulations, 40 CFR 63 Subpart H is the overall most stringent program. Therefore, fugitive emissions shall be monitored as required by this program (40 CFR 63 Subpart H).

Unit or Plant Site	Programs Being Streamlined	Stream Applicability	Overall Most Stringent Program
MDI 2 Plant	40 CFR 63 Sub H	Streams containing 5% VOHAP	40 CFR 63 Subpart H
	40 CFR 60 Sub VV LAC 33:III.2122	Streams containing 10% VOC	

**Prevention of Significant Deterioration Applicability**

N/A

**MACT requirements**

The BASF Geismar facility is a major source of toxic air pollutants (TAPs). The MDI 2 Plant emits carbon tetrachloride, chlorobenzene, chloroform and chlorine above their respective minimum emission rate (MER). Therefore, the MDI 2 Plant shall comply with all applicable provisions of the Louisiana Air Toxics Program, LAC 33:III.Chapter 51, regarding these compounds.

The MDI 2 Plant is a Synthetic Organic Chemical Manufacturing Industry (SOCMI) facility. The MDI 2 Plant shall comply with the applicable provisions of the National Emission Standards for Organic Hazardous Air Pollutants (NESHAP), 40 CFR 63 Subpart F, G and H for process vents, storage vessels, transfer operations, wastewater and equipment leaks, and the applicable provisions of the NESHAP for Hydrochloric Acid Production, 40 CFR 63 Subpart NNNNN.

**Air Quality Analysis**

Dispersion Model(s) Used: None

Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Air Quality Standard (NAAQS)
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**General Condition XVII Activities**

The facility will comply with the applicable General Condition XVII Activities emissions as required by the operating permit rule. However, General Condition XVII Activities are not subject to testing, monitoring, reporting or recordkeeping requirements. For a list of approved General Condition XVII Activities, refer to Section VIII – General Condition XVII Activities of the proposed permit.

**Insignificant Activities**

All Insignificant Activities are authorized under LAC 33:III.501.B.5. For a list of approved Insignificant Activities, refer to Section IX – Insignificant Activities of the proposed permit.

**V. PERMIT SHIELD**

N/A

**VI. PERIODIC MONITORING**

N/A

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## **VII. Glossary**

*Best Available Control Technologies (BACT)* - An emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under this part which would be emitted from any proposed major stationary source or major modification which the administrative authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant.

*CAM* - Compliance Assurance Monitoring rule – A federal air regulation under 40 CFR Part 64

*Carbon Black* - A black colloidal substance consisting wholly or principally of amorphous carbon and used to make pigments and ink.

*Carbon Monoxide (CO)* – (Carbon monoxide) a colorless, odorless gas produced by incomplete combustion of any carbonaceous (gasoline, natural gas, coal, oil, etc.) material.

*Cooling Tower* – A cooling system used in industry to cool hot water (by partial evaporation) before reusing it as a coolant.

*Continuous Emission Monitoring System (CEMS)* – The total combined equipment and systems required to continuously determine air contaminants and diluent gas concentrations and/or mass emission rate of a source effluent.

*Cyclone* – A control device that uses centrifugal force to separate particulate matter from the carrier gas stream.

*Duct Burner* – A device that combusts fuel and that is placed in the exhaust duct from another source (such as a stationary gas turbine, internal combustion engine, kiln, etc.) to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a steam generating unit.

*Federally Enforceable Specific Condition* - A federally enforceable specific condition written to limit the potential to Emit (PTE) of a source that is permanent, quantifiable, and practically enforceable. In order to meet these requirements, the draft permit containing the federally enforceable specific condition must be placed on public notice and include the following conditions:

- A clear statement of the operational limitation or condition which limits the source's potential to emit;
- Recordkeeping requirements related to the operational limitation or condition;
- A requirement that these records be made available for inspection by LDEQ personnel;
- A requirement to report for the previous calendar year.

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*Grandfathered Status*- Those facilities that were under actual construction or operation as of June 19, 1969, the signature date of the original Clean Air Act. These facilities are not required to obtain a permit. Facilities that are subject to Part 70 (Title V) requirements lose grandfathered status and must apply for a permit.

*Heat Recovery Steam Generator (HRSG)* – A steam generator that recovers exhaust heat from a gas turbine, and provides economizing and steam generation surfaces.

*Hydrogen Sulfide (H<sub>2</sub>S)* - A colorless inflammable gas having the characteristic odor of rotten eggs, and found in many mineral springs. It is produced by the action of acids on metallic sulfides, and is an important chemical reagent.

*Maximum Achievable Control Technology (MACT)* - The maximum degree of reduction in emissions of each air pollutant subject to LAC 33:III.Chapter 51 (including a prohibition on such emissions, where achievable) that the administrative authority, upon review of submitted MACT compliance plans and other relevant information and taking into consideration the cost of achieving such emission reduction, as well as any non-air-quality health and environmental impacts and energy requirements, determines is achievable through application of measures, processes, methods, systems, or techniques.

*NESHAP* - National Emission Standards for Hazardous Air Pollutants –Air emission standards for specific types of facilities, as outlined in 40 CFR Parts 61 through 63

*Nitrogen Oxides (NO<sub>x</sub>)* - Compounds whose molecules consist of nitrogen and oxygen.

*Nonattainment New Source Review (NNSR)* - A New Source Review permitting program for major sources in geographic areas that do not meet the National Ambient Air Quality Standards (NAAQS) at 40 CFR Part 50. Nonattainment NSR is designed to ensure that emissions associated with new or modified sources will be regulated with the goal of improving ambient air quality.

*NSPS* - New Source Performance Standards – Air emission standards for specific types of facilities, as outlined in 40 CFR Part 60

*Organic Compound* - Any compound of carbon and another element. Examples: Methane (CH<sub>4</sub>), Ethane (C<sub>2</sub>H<sub>6</sub>), Carbon Disulfide (CS<sub>2</sub>)

*Part 70 Operating Permit* - Also referred to as a Title V permit, required for major sources as defined in 40 CFR 70 and LAC 33:III.507. Major sources include, but are not limited to, sources which have the potential to emit: ≥10 tons per year of any toxic air pollutant; ≥25 tons of total toxic air pollutants; and ≥100 tons per year of regulated pollutants (unless regulated solely under 112(r) of the Clean Air Act) (25 tons per year for sources in non-attainment parishes).

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*PM<sub>10</sub>* - Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by the method in Title 40, Code of Federal Regulations, Part 50, Appendix J.

*Potential to Emit (PTE)* - The maximum capacity of a stationary source to emit any air pollutant under its physical and operational design.

*Prevention of Significant Deterioration (PSD)* - A New Source Review permitting program for major sources in geographic areas that meet the National Ambient Air Quality Standards (NAAQS) at 40 CFR Part 50. PSD requirements are designed to ensure that the air quality in attainment areas will not degrade.

*Selective Catalytic Reduction (SCR)* - A noncombustion control technology that destroys NO<sub>x</sub> by injecting a reducing agent (e.g., ammonia) into the flue gas that, in the presence of a catalyst (e.g., vanadium, titanium, or zeolite), converts NO<sub>x</sub> into molecular nitrogen and water.

*Sulfur Dioxide (SO<sub>2</sub>)* - An oxide of sulphur.

*TAP* - Toxic Air Pollutant (LDEQ acronym for air pollutants regulated under LAC 33 Part III, Chapter 51, Tables 1 through 3).

*Title V permit* - See Part 70 Operating Permit.

*"Top Down" approach* - An approach which requires use of the most stringent control technology found to be technically feasible and appropriate based on environmental, energy, economic, and cost impacts.

*Turbine* - A rotary engine in which the kinetic energy of a moving fluid is converted into mechanical energy by causing a bladed rotor to rotate.

*Volatile Organic Compound (VOC)* - Any organic compound which participates in atmospheric photochemical reactions; that is, any organic compound other than those which the administrator of the U.S. Environmental Protection Agency designates as having negligible photochemical reactivity.